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EXAMINER

STREGE, JOHN B

ART UNIT PAPER NUMBER

2625

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5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/911,743

Applicant(s)

HAMID, LARRY

Examiner

John B Strege

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 and 28-38 is/are allowed.
- 6) ☒ Claim(s) 1-16, 18-23 and 25-27 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Claim Objections

1. Claims 12, 16, and 17 are objected to because of the following informalities:
Claim 12 should start with the letter "A". In claim 16 line 3 and claim 17 line 5 the word "of" in "produce a of hash" should be omitted. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 12, and 25-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "the sector quantization" on line 6. The is insufficient antecedent basis for this limitation in the claim.

Claim 25-27 recites the limitation "the step of determining an unordered password" in lines 1-2. There is insufficient antecedent basis for these limitations in the claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-5, 8, 10-15, 18, 19, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Estrada USPN 4,325,570 in view of Jain et al. USPN 6,185,318 (hereinafter "Jain").

Estrada discloses superimposing a grid 18 over an individual's fingerprint 16 (figure 1). A fingerprint characteristic in each of the squares of the grid is selected and this characteristic is encoded based on its type (col. 3 lines 30-49). These encoded numbers are then used to create an identifier string for the fingerprint (col. 4 lines 10-14). Estrada does not explicitly disclose extracting fingerprint characteristics but instead discloses selecting which is similar.

Jain discloses a system and method for matching fingerprint images using an aligned string base representation. In figure 2 Jain discloses that in prior art systems it is well known to extract features (step 220) after acquiring the image (step 210) in order to find reliable features for matching (col. 2 lines 1-2). This forms part of the primary backbone of a typical minutia based automatic fingerprint identification system (col. 2 lines 3-6).

Estrada and Jain are analogous art because they are from the same field of endeavor of fingerprint matching.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Estrada and Jain to extract feature characteristics to make an automatic fingerprint identification system. The motivation for doing so would be to process the matching of fingerprints in a much faster manner. Thus it would have been

obvious to one of ordinary skill in the art to combine Estrada and Jain to obtain the invention as specified in claim 1.

Regarding claim 2, as discussed Estrada selecting characteristic features, identifying a type of the features, and encoding the feature based on its type (col. 3 lines 30-43).

Regarding claim 3, the symbols encoded by Estrada are the numerical values 0-9 which are 10-bit values, and further states that they can be alpha, numeric, or alpha numeric designations or symbols (col. 3 lines 16-20).

Regarding claim 4, a grid-position number is used by Estrada to mark the location of the features, and the features are encoded based on the grid square position numbers (col. 4 lines 10-15).

Regarding claim 5, the grid disclosed by Estrada is oriented such that the core of the fingerprint is centrally located within the grid (col. 3 lines 10-12), therefore the encoding of the features is based on the location of the feature (col. 4 lines 10-15) and based on their orientation to the core. Furthermore Jain discloses that the M minutiae in the input fingerprint representation is defined and represented as a first string of tuples where each tuple is described by its x-coordinate, y-coordinate, and orientation (col. 13 lines 21-30).

Regarding claim 8, Estrada discloses that in prior fingerprint systems, the characteristics listed are not disclosed to be set forth in any specific order (col. 1 lines 40-43).

Regarding claim 10, Estrada discloses that the technique discussed above is used to create an identification card, wherein a user attempting a transaction can be compared to the fingerprint on the card to determine if they match (col. 4 lines 35-61).

Regarding claim 11, as discussed the combination of Estrada and Jain extract a number of features from the fingerprint and encodes them. Estrada discloses that only a few grid-squares of the fingerprint would have to be checked to determine if there was a match, thus disregarding the extra features that were selected (col. 4 lines 55-61).

Regarding claims 12-15, Estrada does not explicitly disclose quantization tolerances, or requantization possibilities in the sectors. Jain discloses that several constraints exist with the prior art such as the finger being placed at different locations or orientations on the platen resulting in translation and disorientation problems, or the finger exerting different pressure resulting in a global spatial scaling of the minutiae thus requiring a proper scaling factor, as well as other problems (col. 4 lines 17-62). In order to overcome these problems Jain discloses a matching process that adaptively establishes a correspondence between candidate points (col. 7 lines 12-14). Each minutia is represented by a string of tuples which give the x-coordinate, y-coordinate, and orientation of all the minutia (col. 13 lines 21-23). This string is converted to polar coordinates to derive a one dimensional string representation of the fingerprints (col. 13 lines 35-37) consisting of an e-angle, t-angle, and radius (col. 14 lines 1-2). The e-angle and radii of two distinct but spatially close minutiae could be reduced to the same quantized values for a coarse quantization scheme (col. 14 lines 49-52). The one-dimensional representation of a two-dimensional fingerprint reduces the complexity of



matching a two dimensional pattern and permits the use of approximate string matching algorithms (col. 15 lines 50-53). Various threshold tolerances are set within the string matching algorithm (col. 17 lines 55-60, col. 18 lines 29-39). At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Estrada and Jain to provide for quantization errors in the sectors of the grid. The motivation for doing so would be to avoid false negatives resulting from fingerprints from the same person but due to small differences not exactly the same.

Claim 18 has similar limitations to claim 1 with the added limitation of the contact imager for imaging the biometric sample comprises a platen disposed for accepting biometric information. This is well known in the art of biometrics as disclosed by Jain (col. 3 lines 43-45).

Claims 19 and 21-22 are similar to claim 12, thus the same arguments used for the rejection of claim 12 apply equally to the rejection of claims 19, and 21-22.

6. Claims 6-7, 9, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Estrada USPN 4,325,570 in view of Jain et al. USPN 6,185,318, and further in view of Sparrow USPN 4,817,183.

Regarding claims 6-7 and 9, Estrada discloses that the grid 18 is preferably positioned (or oriented) such that the core of fingerprint 16 is centrally located within the grid 18, thus the core must be identified. As discussed a feature is selected in each sector of the grid thus determining a sector where a feature is located and for each determined sector the encoded feature is used to form an identification string (col. 4

lines 10-15). Estrada nor Jain explicitly disclose encoding a value indicative of the determined sector for the extracted feature location.

Sparrow discloses a fingerprint coding and recognition method based on minutiae (col. 1 lines 15-20). Sparrow recites a central point of the fingerprint such as a core is selected and based on this a hexadecimal digital code representing the type of minutia and the angular coordinate of the irregularity is recorded (col. 2 lines 3-20). Thus, a list of coordinate sets specifies the topology of an sector uniquely. This allows for very fast comparison of fingerprints (col. 2 lines 39-39).

Estrada, Jain, and Sparrow are all analogous art because they are all from the same field of endeavor of fingerprint matching.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Estrada, Jain, and Sparrow to encode a value indicative of the determined sector for extracted feature locations. The motivation for doing this would be to allow for faster comparison of the fingerprints as specified by Sparrow. Thus it would have been obvious to one of ordinary skill in the to combine Estrada, Jain, and Sparrow to obtain the invention as specified in claims 6-7, and 9.

Claim 23 is similar to claim 6, thus the same arguments used for the rejection of claim 6 apply equally to the rejection of claim 23.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Estrada USPN 4,325,570 in view of Jain et al. USPN 6,185,318 and further in view of Toyoda et al. (hereinafter "Toyoda").

Neither Estrada nor Jain explicitly disclose masking the symbols.

Toyoda discloses an identification apparatus for confirming individuals by using a pattern recognition technique (col. 1 lines 10-13). Figure 7 discloses using a mask with an input fingerprint image that allows for improved comparison between a reference candidate with comparative fingerprints, that allows for taking into account environmental factors and similarities between different users fingerprints to prevent false negatives and false positives (col. 1 line 65 - col.2 line 6). When the correlation value exceeds the threshold the masking operation is performed (col. 17 lines 8-12).

Estrada, Jain, and Toyoda are all analogous art because they are all from the same field of endeavor of fingerprint matching.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Estrada, Jain, and Toyoda to mask the fingerprint (and thus its symbols) to better focus on the differences of each fingerprint. The motivation for doing so would be to improve the comparison process and eliminate false negatives and false positives. Thus it would have been obvious to one of ordinary skill in the art to combine Estrada, Jain, and Toyoda to obtain the invention as specified in claim 20.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Estrada USPN 4,325,570 in view of Jain et al. USPN 6,185,318 (hereinafter "Jain") and further in view of Bjorn USPN 6,035,398.

Neither Estrada nor Jain explicitly disclose hashing the string to produce a hash value for comparison with a stored hash value. However the hashing of biometric information is well known.

Bjorn discloses a method of producing a cryptographic key using biometric data (col. 1 lines 39-41). A feature extraction unit receives a fingerprint from a fingerprint sensor (step 415 figure 4) and additional features of the fingerprints (step 425). These features of the fingerprints are hashed to create a cryptographic key (430) that is used with the template, and comparison of this template with a user attempting access is carried out (455).

Estrada, Jain, and Bjorn are all analogous art because they are all from the same field of endeavor of fingerprint matching.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Estrada, Jain, and Bjorn to hash the string attained by Estrada for added security purposes. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Estrada, Jain, and Bjorn to obtain the invention as specified in claim 16.

Allowable Subject Matter

9. Claims 24, and 28-38 are allowed.

10. The following is an examiner's statement of reasons for allowance:

Regarding claim 24, none of the prior art disclose a method of password generation comprising hashing a plurality of strings determined in dependence upon predetermined

characteristics of a first string, and comparing each hash value from the plurality of hash values against a stored hash value determined during an enrollment process. Estrada, Jain, and Bjorn are the closest prior art but they do not explicitly disclose this. Thus claim 24 is allowable.

Claim 35 is more detailed than claim 24 in that the plurality of strings are disclosed as error strings. Thus claim 35 is allowable for the same reasons given for claim 24.

Claims 28-34, and 36-38 are dependent on allowable claims and are allowable for the same reasons as the claims they depend on.

11. Claims 25-27 would be allowable if rewritten to overcome the rejections under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

12. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and further correcting the minor errors specified at the beginning of the action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is (703) 305-8679. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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